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Name \_\_\_\_\_

Stress, strain, breaking point, force, mass, weight, modulus of expansion.

A 5.0 meter long steel wire has a diameter of 1.00 centimeter. For steel, Young's modulus is  $20. \times 10^{10}$  pascals, the shear modulus is  $8.4 \times 10^{10}$  pascals, the bulk modulus is  $16 \times 10^{10}$  pascals, and the ultimate tensile strength, as well as the ultimate compressive strength, is  $5.0 \times 10^8$  pascals. A mass of 3500 kilograms is supported by the wire.

- (a) Determine the weight of the mass in newtons if this activity takes place on Earth where  $g = 9.8 \text{ m/s}^2$ . (b) Determine the cross sectional area of the wire in square meters. (c) Determine the stress on the wire in pascals. (d) Determine the amount that the wire is stretched, in meters, by the hanging mass. (e) Determine the strain on the wire. (f) Determine the amount of mass that the wire can support before it breaks. Place answers in the correct box below in proper scientific notation, to the correct number of significant digits, and with the proper units. Show your work below.

(a) Weight of mass	(b) cross-sectional area	(c) Stress on wire
(d) Amount of stretch	(e) Strain on wire	(f) Mass to break wire